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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/060,208	02/01/2002	Wilson Burgess	CI-0026	7581

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EXAMINER	
MCKANE, ELIZABETH L	

ART UNIT	PAPER NUMBER
1744	

DATE MAILED: 08/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/060,208	BURGESS ET AL.	
	Examiner	Art Unit	
	Leigh McKane	1744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 June 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *107 and 124-168* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *107* is/are allowed.

6)☒ Claim(s) *124-154 and 157-168* is/are rejected.

7)☒ Claim(s) *155 and 156* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 124, 128, 129, 131, and 166 are rejected under 35 U.S.C. 102(b) as being anticipated by Freistedt et al (Abstract of DD 280466).

Freistedt et al teaches a method for sterilizing soft tissue implants (skin) wherein the tissue is contacted with propylene glycol, frozen, and irradiated.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 125, 140-143, 147, 160, 163, 164, and 167 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freistedt.

Freistedt teaches contacting the tissue with a radio protectant which may be a glycol "and/or DMSO". As Friestedt discloses that more than one radio-protectant may be used, one of ordinary skill in the art would have found it obvious to use an additional radio-protectants in combination with the propylene glycol in order to optimize treatment of the particular tissue. Moreover, as Friestedt discloses employing a 5-95% solution of the radio-protectant, it is deemed obvious to optimize the concentration/molecular weight used.

7. Claim 136 is rejected under 35 U.S.C. 103(a) as being unpatentable over Friestedt as applied to claim 124 above, and further in view of Kent (U.S. Patent No. 6,171,549).

The abstract of Friestedt fails to teach an irradiation dose rate. Kent, however, teaches that when sterilizing sensitive biological materials with gamma radiation, one should choose a low dose rate (0.1-3.0 kGy/hr). See Abstract. As this dose rate is disclosed by Kent to be effective in sterilizing without undue damage to the biological

material, it would have been obvious to use in Friestedt.

8. Claims 148, 161, 162, and 165 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friestedt as applied to claims 125 and 147 above, and further in view of Okrongly et al (U.S. Patent No. 5,283,034).

With respect to claims 148, 161, and 162, Friestedt teaches the use of DMSO as a radioprotectant but does not disclose using mannitol or trehalose. Okrongly discloses that it was known in the art at the time of the invention to add radioprotectants such as polyols or reduced forms thereof to surfaces undergoing radiation sterilization for the purpose of oxygen scavenging. Particularly disclosed are mannitol and trehalose. As Friestedt discloses using polyols in general, it would have been obvious to use mannitol and trehalose, as disclosed by Okrongly to be capable oxygen scavengers.

As to claim 165, Okrongly teaches the known packaging of an article to be sterilized by radiation. See col.5, line 60 to col.6, line 2. The packaging prevents the recontamination of the surface after sterilization. A step of packaging followed by terminal sterilization is well-known in the sterilization art and would have been obvious in the method of Friestedt.

9. Claims 137-139 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freistedt as applied to claims 125 above, and further in view of Peterson (U.S. Patent No. 5,730,933).

Although Freistedt fails to disclose a total dose, Peterson teaches irradiating biological materials so as to receive a dose of 30 kGy (3 Mrad). Nevertheless, it is deemed within the purview of one in the art to optimize total dose, as a result effective variable.

10. Claims 124, 126, 127, and 130-135 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peterson in view of Freistedt.

Peterson teaches the use of e-beam or gamma radiation to sterilize a biological material (e.g. demineralized bone matrix) that is sensitive to radiation, wherein a stabilizer (antioxidant/free-radical scavenger, such as ascorbate or propyl galate) is added to the material prior to irradiation and the material is then irradiated within a package "under standard sterilization conditions...at an intensity and for a time duration sufficient to destroy substantially all of the microorganism contamination" (col.4, lines 59-64). See also col.4, lines 36-51; col.6, lines 1-18. The material may also be lyophilized or dried with drying agents and/or frozen and placed under a vacuum or inert gas, such as nitrogen or argon (col.4, lines 51-58; col.5, lines 28-35 and lines 53-67). The free-radical scavengers disclosed by Peterson do not include propylene glycol.

Freistedt teaches a method for sterilizing soft tissue implants (skin) wherein the tissue is contacted with propylene glycol, frozen, and irradiated. The propylene glycol acts as a radioprotectant, scavenging free-radicals.

As Freistedt evidences that propylene glycol is an effective stabilizer for tissue sterilization, it would have been obvious to use in the method of Peterson.

11. Claim 136 is rejected under 35 U.S.C. 103(a) as being unpatentable over Peterson and Friestedt as applied to claim 124 above, and further in view of Kent (U.S. Patent No. 6,171,549).

Peterson teaches irradiation "under standard sterilization conditions...at an intensity and for a time duration sufficient to destroy substantially all of the

microorganism contamination" (col.4, lines 59-64). Peterson does not specify what the intensity (dose rate) is. Kent, however, teaches that when sterilizing sensitive biological materials with gamma radiation, one should choose a low dose rate (0.1-3.0 kGy/hr). See Abstract. As this dose rate is disclosed by Kent to be effective in sterilizing without undue damage to the biological material, it would have been obvious to use in the method of Peterson.

12. Claims 124, 125, 128, 129, 149, 150, 152, 153, 154, 163, 164, and 166 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bateman et al (WO 88/06043).

Bateman et al teaches a method of sterilizing collagen wherein the collagen is stabilized with a water soluble polymer (propylene glycol), crosslinked with glutaraldehyde, and sterilized with gamma radiation. The pH is maintained prior to irradiation and the collagen may be dried prior to irradiation. See page 4, lines 1-20; page 5, lines 21-23; page 6, lines 14-18; page 7, lines 33-38; and page 8, lines 5-10. Although Bateman et al fails to disclose an example using PPG as the water soluble polymer, it's use is disclosed by Batemen et al and would have been obvious to the skilled practitioner. Moreover, it is deemed obvious to dry the collagen, as is disclosed by Bateman et al, to the extent deemed necessary by the practitioner.

13. Claims 124, 144, 145, 150, 151, 157-159, and 168 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horowitz et al (U.S. Patent No. 5,712,086) in view of Freistedt.

With respect to claims 124, 144, 157-159, and 168, Horowitz et al teaches a method of radiation sterilizing sensitive biological materials combined with stabilizer

mixtures and sensitizers (purpurins, phthalocyanines, psoralens, etc.). See Abstract. The stabilizer/scavenger can be mannitol and/or glycerol, among others. Horowitz et al discloses exposing the materials to particular fluences of radiation (col6, lines 57-62) for particular time periods (col.7, lines 45-48). Radiation sources include gamma radiation. The free-radical scavengers disclosed by Horowitz et al do not include propylene glycol.

Freistedt teaches a method for sterilizing soft tissue implants (skin) wherein the tissue is contacted with propylene glycol, frozen, and irradiated. The propylene glycol acts as a radioprotectant, scavenging free-radicals.

As Freistedt evidences that propylene glycol and DMSO are effective stabilizers for tissue sterilization and that propylene glycol is a polyol like the mannitol of Horowitz et al. Thus, it would have been obvious to use propylene glycol and/or DMSO either alone or in combination with the stabilizers of Horowitz et al.

As to claim 145, it is deemed obvious to optimize the concentration of mannitol utilized in the invention based upon treatment parameters such as degree of tissue contamination, type and amount of tissue, and irradiation rate. Such is ordinarily determined by routine experimentation.

With respect to claims 150 and 151, Horowitz et al discloses that it was known in the art to combine the treatment of a biological material with irradiation and a stabilizer mixture with a second virucidal treatment such as, treatment with an organic (lipid) solvent. See col.7, line 66 to col.8, line 8.

14. Claim 146 is rejected under 35 U.S.C. 103(a) as being unpatentable over Horowitz et al and Freistedt as applied to claim 125 above, and further in view of Okrongly.

The combination of Horowitz et al with Freistedt teaches the use of oxygen scavengers for tissue protection during radiation sterilization but does not teach trehalose as a scavenger. Okrongly discloses that it was known in the art at the time of the invention to add radioprotectants such as polyols or reduced forms thereof to surfaces undergoing radiation sterilization for the purpose of oxygen scavenging. Particularly disclosed are mannitol and trehalose. As trehalose is a polyol like those used by Horowitz et al and is effective in free-radical scavenging in radiation sterilization, it would have been an obvious scavenger in the method of Horowitz et al.

Allowable Subject Matter

15. Claims 155 and 156 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. Claim 107 is allowed.

17. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record fails to teach or suggest: a glassy or vitrified biological material; the use of a compound effective to increase penetration of the stabilizer; or an assay for determining the optimal conditions for sterilizing a collagen containing tissue.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leigh McKane whose telephone number is 571-272-1275. The examiner can normally be reached on Monday-Wednesday (7:15 am-4:45 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert J. Warden can be reached on 571-272-1275. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Leigh McKane

Leigh McKane
Primary Examiner
Art Unit 1744

elm
9 August 2004